



## **Instrument Flight Procedure Design Course: PANS-OPS, PBN and Obstacle Assessment**



## **Instrument Flight Procedure Design Course: PANS-OPS, PBN and Obstacle Assessment**

### **Introduction:**

Instrument flight procedure design to PANS-OPS and PBN criteria, with obstacle assessment, is the subject of this 10-day course for air navigation service provider, oversight and airport safeguarding units, who produce an IFP Design and Validation Package Plan for a case aerodrome. Departure, arrival and approach procedures stall or return for rework when protection areas, obstacle data, navigation specifications and validation evidence are prepared by separate desks without one quality trail. Nominees already draft, review or approve procedures and work through modelling builds on survey, terrain and chart data. CoreConcept Training Center delivers this instrument flight procedure design course.

### **Course Objectives:**

- Construct departure, arrival and approach segments and their primary and secondary protection areas to PANS-OPS Doc 8168 criteria
- Select PBN navigation specifications from the Doc 9613 PBN Manual for each flight phase and apply the matching RNAV and RNP design rules
- Assess obstacles against protection surfaces, derive minimum altitudes and OCA/H, and screen proposed structures for procedure safeguarding
- Plan ground and flight validation of a new or amended procedure, including database coding checks and flyability review
- Apply the Doc 9906 quality assurance process to procedure design records, designer competence and design software validation
- Assemble an IFP Design and Validation Package Plan with obstacle evidence, validation steps and oversight checkpoints

### **Target Audience:**

- Procedure design units in air navigation service providers responsible for drafting and amending SIDs, STARs and approaches
  - Oversight and inspection staff responsible for reviewing and approving submitted procedure designs
  - Airport safeguarding and obstacle control staff responsible for assessing cranes, buildings and terrain near aerodromes
  - Aeronautical information and charting staff responsible for publishing procedure data and coded waypoints
  - Flight operations and validation pilots responsible for flyability checks of new procedures
-

## **Course Outline:**

### **Day 1: Instrument Procedure Foundations and Design Context**

- PANS-OPS Doc 8168 Volume Structure and Design Scope
- Visual and Instrument Procedure Types Compared by Flight Phase
- Aircraft Categories and Speed Bands Used in Design
- Conventional Navaid Procedures Versus Area Navigation Routes
- Procedure Design Lifecycle From Request to Publication

### **Day 2: PANS-OPS Criteria and PBN Navigation Specifications**

- Approach Segment Sequence From Initial to Missed Approach
- Primary and Secondary Area Concept for Obstacle Clearance
- Doc 9613 PBN Manual Navigation Specification Catalogue
- RNAV Versus RNP Onboard Performance Monitoring and Alerting
- Fly-By and Fly-Over Waypoint Rules for Turn Construction

### **Day 3: Departure, Arrival and Approach Construction**

- Standard Instrument Departure Climb Gradient and Turn Areas
- Standard Terminal Arrival Route Descent Planning and Holding
- RNP Approach Lateral Guidance Final Segment Layout
- Missed Approach Climb Surface and Turning Point Construction
- Holding Pattern Template Construction and Entry Sectors

### **Day 4: Obstacle Data, Terrain Models and Design Tools**

- Electronic Obstacle and Terrain Data Sets for Procedure Design
- Survey Accuracy and Integrity Requirements for Obstacle Data
- Procedure Design Software Workflow From Data Import to Output
- Minimum Obstacle Clearance Calculation Across Each Segment
- OCA/H Derivation and Controlling Obstacle Identification

### **Day 5: Guided Case Study on an RNP Approach for a Case Aerodrome**

- Case Aerodrome Runway, Terrain and Obstacle Data Pack
  - RNP Approach Waypoint Placement and Segment Length Build
  - Protection Area Drawing and Obstacle Penetration Check
  - Minimum Sector Altitude and OCA/H Result Tabulation
  - Peer Review of Case Design Against PANS-OPS Criteria
-

## **Day 6: Advanced PBN Applications and Vertical Guidance**

- RNP AR Approach Authorisation and Curved Path Design
- Radius to Fix Legs for Repeatable Terminal Turns
- Baro-VNAV Vertical Path and Obstacle Assessment Surface
- Continuous Descent and Climb Profiles in Arrival Design
- Conventional to PBN Procedure Replacement Transition Planning

## **Day 7: Quality Assurance and Oversight Under Doc 9906**

- Doc 9906 Quality Assurance Process for Flight Procedure Design
- Designer Competence Records and Supervised Training Logs
- Design Software Validation Evidence and Version Control
- Regulator Approval Checklist for Submitted Procedure Packages
- Periodic Procedure Review Cycle and Obstacle Change Triggers

## **Day 8: Flight Validation, Safeguarding and Stakeholder Coordination**

- Ground Validation Using Simulator and Flyability Review
- Flight Validation Inspection of Navaid and Obstacle Data
- Annex 14 Surfaces Compared With PANS-OPS Protection Surfaces
- Crane and Building Proposal Screening Against Procedure Surfaces
- Airspace User Consultation on New Arrival and Departure Routes

## **Day 9: Data Integrity, Publication and Performance Review**

- Path Terminator Coding Verification for Navigation Databases
- Aeronautical Chart Depiction Checks Before Publication
- Procedure Data Error Reporting and Correction Workflow
- Procedure Use, Missed Approach and Go-Around Event Review
- Design Rework Rate and Approval Cycle Time Tracking

## **Day 10: Modelling Build Capstone on an IFP Design and Validation Package**

- Case Organisation Procedure Request and Constraint Brief
  - SID and STAR Pairing Built From Week-One Segment Methods
  - Obstacle Assessment Report With Controlling Obstacles Listed
  - Validation and Quality Assurance Checkpoint Schedule Build
  - IFP Design and Validation Package Plan Completion and Review
-

## Skills You Will Gain:

- Protection Area Construction
- Navigation Specification Selection
- Obstacle Clearance Assessment
- Procedure Safeguarding Screening
- Flight Validation Planning
- Design Quality Assurance
- Path Terminator Coding Review
- Procedure Approval Review

## Why Attend This Course:

- Deliver an IFP Design and Validation Package Plan for a case aerodrome to the head of procedure design and the oversight inspector who approves it
- Decide which PBN navigation specification, segment layout and minimum altitude a procedure can support from the obstacle evidence
- Avoid rejected submissions, late validation flights and published procedures withdrawn after an unscreened obstacle appears
- Brief designers, charting staff and validation pilots with the protection area sheets, checklists and quality records used in the course

## Conclusion:

Back at work, the participant presents the IFP Design and Validation Package Plan to the procedure design lead, the oversight inspector and the aerodrome safeguarding team. They use it to agree which procedures are designed or amended first, which obstacle data must be resurveyed and which validation steps are needed before publication. After the first procedure passes approval, the unit should compare rework items, validation findings and approval time with the plan, then update its quality records and obstacle change triggers.

## Frequently Asked Questions FAQ:

### What should participants know before an instrument flight procedure design course on PANS-OPS and PBN?

Participants should already work with instrument procedures, aeronautical data or aerodrome safeguarding and read charts and basic geometry. Bringing an anonymised procedure, obstacle list or terrain extract helps them test the design and obstacle assessment methods on familiar ground.

---

## **How does instrument flight procedure design differ from an air traffic management or airport planning course?**

Procedure design builds the flight paths themselves: segments, protection areas, obstacle clearance and minima. Air traffic management courses balance airspace demand and flow, while airport planning courses size runways, aprons and terminals.

## **Why do PANS-OPS protection surfaces and Annex 14 obstacle limitation surfaces give different answers for the same obstacle?**

They protect different things. Annex 14 surfaces keep the aerodrome environment clear, while PANS-OPS surfaces guarantee minimum obstacle clearance for a specific procedure, so a structure allowed under one may still raise procedure minima under the other.

## **What do participants take back from the instrument flight procedure design and obstacle assessment course?**

Participants take back an IFP Design and Validation Package Plan for a case aerodrome, with protection area worksheets, an obstacle assessment report, a validation schedule and a Doc 9906 quality checklist they can adapt to their own unit.

---